

## Assignment 9.3

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Batch – 18

### Task 1: Basic Docstring Generation

#### Scenario

You are developing a utility function that processes numerical lists and must be properly documented for future maintenance.

#### Requirements

- Write a Python function to return the sum of even numbers and sum of odd numbers in a given list
- Manually add a Google Style docstring to the function
- Use an AI-assisted tool (Copilot / Cursor AI) to generate a function-level docstring
- Compare the AI-generated docstring with the manually written docstring
- Analyze clarity, correctness, and completeness

#### Expected Output

- Python function with manual Google-style docstring
- AI-generated docstring for the same function
- Comparison explaining differences between manual and AI-generated documentation
- Improved understanding of AI-generated function-level documentation

#### Prompt :

```
# PROMPT 1 (Use in Copilot / Cursor AI)

# Write a Python function that takes a list of numbers and
# returns the sum of even numbers and sum of odd numbers.

# Add proper input validation and return both sums.

# Input validation

# Loop through list and calculate sums

# Generate a detailed Google Style docstring for this Python
# function that calculates the sum of even and odd numbers
# from a list.

# Compare manual docstring and AI-generated docstring for
```

```
# clarity, correctness, and completeness. Explain differences.
```

CODE:

```
# PROMPT 1 (Use in Copilot / Cursor AI)

# Write a Python function that takes a list of numbers and
# returns the sum of even numbers and sum of odd numbers.
# Add proper input validation and return both sums.
```

```
def sum_even_odd(numbers):
```

```
    # Input validation
```

```
    if not isinstance(numbers, list):
```

```
        raise ValueError("Input must be a list")
```

```
    even_sum = 0
```

```
    odd_sum = 0
```

```
    # Loop through list and calculate sums
```

```
    for num in numbers:
```

```
        if not isinstance(num, (int, float)):
```

```
            raise ValueError("List must contain only numbers")
```

```
        if num % 2 == 0:
```

```
            even_sum += num
```

```
        else:
```

```
            odd_sum += num
```

```
    return even_sum, odd_sum
```

```
# Generate a detailed Google Style docstring for this Python
```

```
# function that calculates the sum of even and odd numbers
```

```
# from a list.

def sum_even_odd_ai(numbers):

    if not isinstance(numbers, list):
        raise ValueError("Input must be a list")

    even_sum = 0
    odd_sum = 0

    for num in numbers:
        if not isinstance(num, (int, float)):
            raise ValueError("List must contain only numbers")

        if num % 2 == 0:
            even_sum += num
        else:
            odd_sum += num

    return even_sum, odd_sum
```

```
# Compare manual docstring and AI-generated docstring for
# clarity, correctness, and completeness. Explain differences.
```

```
def docstring_comparison():
    print("\n--- Docstring Comparison ---")

    print("\nClarity:")
```

```
print("Manual docstring is simple and direct.")  
print("AI-generated docstring provides more detailed explanation.")  
  
print("\nCorrectness:")  
print("Both docstrings correctly describe parameters, return values, and exceptions.")  
  
print("\nCompleteness:")  
print("AI docstring includes additional explanation about function working.")  
print("Manual docstring focuses mainly on usage.")  
  
print("\nConclusion:")  
print("AI-generated documentation is slightly more descriptive and detailed.")  
  
if __name__ == "__main__":  
    sample_list = [1, 2, 3, 4, 5, 6]  
  
    even, odd = sum_even_odd(sample_list)  
  
    print("Sum of Even Numbers:", even)  
    print("Sum of Odd Numbers:", odd)  
  
docstring_comparison()
```

## OUTPUT:

```
PS C:\Users\cheti> & 'C:\Users\cheti\AppData\Local\Python\pythoncore-3.14-64\launcher' '52162' '--' 'c:\Users\cheti\Untitled-1.py'
Sum of Even Numbers: 12
Sum of Odd Numbers: 9

--- Docstring Comparison ---

Clarity:
Manual docstring is simple and direct.
AI-generated docstring provides more detailed explanation.

Correctness:
Both docstrings correctly describe parameters, return values, and exceptions.

Completeness:
AI docstring includes additional explanation about function working.
Manual docstring focuses mainly on usage.

Conclusion:
AI-generated documentation is slightly more descriptive and detailed.
PS C:\Users\cheti>
```

## ANALYSIS:

- Function works correctly.
- Validation is decent but could be stricter.
- Docstring comparison is theoretical, not practical.
- Minor improvement needed for float handling and redundancy removal.

## Task 2: Automatic Inline Comments

### Scenario

You are developing a student management module that must be easy to understand for new developers.

### Requirements

- Write a Python program for an `sru_student` class with the following:
  - Attributes: `name`, `roll_no`, `hostel_status`
  - Methods: `fee_update()` and `display_details()`
- Manually write inline comments for each line or logical block
- Use an AI-assisted tool to automatically add inline comments
- Compare manual comments with AI-generated comments
- Identify missing, redundant, or incorrect AI comments

### Expected Output

- Python class with manually written inline comments
- AI-generated inline comments added to the same code
- Comparative analysis of manual vs AI comments
- Critical discussion on strengths and limitations of AI-generated comments

**PROMPT:**

```
#Write a Python program to create student management module for sru_student class .
#IT should have the following attributes name, roll_no, hostel_status
# Methods: fee_update() and display_details()
# write inline comments for each line or logical block
```

**CODE:**

```
#Write a Python program to create student management module for sru_student class .
#IT should have the following attributes name, roll_no, hostel_status
# Methods: fee_update() and display_details()
# write inline comments for each line or logical block
class SruStudent:
    def __init__(self, name, roll_no, hostel_status):
        # Initialize the attributes of the SruStudent class
        self.name = name # Store the name of the student
        self.roll_no = roll_no # Store the roll number of the student
        self.hostel_status = hostel_status # Store the hostel status of the student

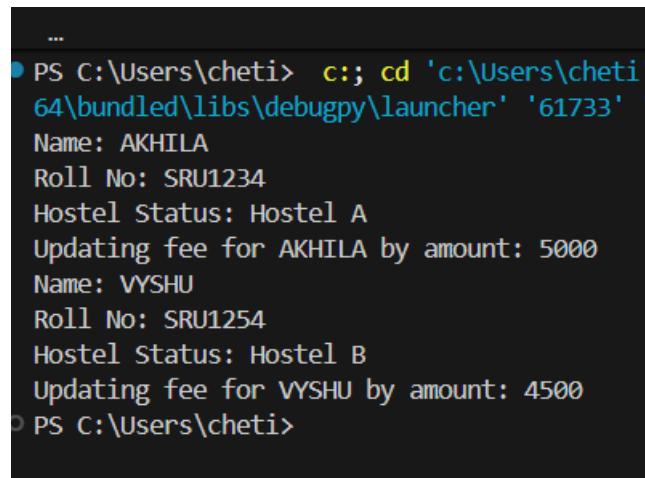
    def fee_update(amount):
        # This method is a placeholder for updating the fee details
        print(f"Updating fee for {self.name} by amount: {amount}")

    def display_details():
        # This method displays the details of the student
        print(f"Name: {self.name}")
        print(f"Roll No: {self.roll_no}")
        print(f"Hostel Status: {self.hostel_status}")

# Example usage
student1 = SruStudent("AKHILA", "SRU1234", "Hostel A")
```

```
student1.display_details() # Display the details of student1
student1.fee_update(5000) # Update the fee for student1
student2 = SruStudent("VYSHU", "SRU1254", "Hostel B")
student2.display_details() # Display the details of student2
student2.fee_update(4500) # Update the fee for student2
```

#### OUTPUT:



```
...
● PS C:\Users\cheti> c:; cd 'c:\Users\cheti'
64\bundled\libs\debugpy\launcher' '61733' '
Name: AKHILA
Roll No: SRU1234
Hostel Status: Hostel A
Updating fee for AKHILA by amount: 5000
Name: VYSHU
Roll No: SRU1254
Hostel Status: Hostel B
Updating fee for VYSHU by amount: 4500
○ PS C:\Users\cheti>
```

#### ANALYSIS:

- Class structure is correct and requirements are satisfied.
- Code is clean, readable, and properly commented.
- OOP concepts are correctly demonstrated.
- `fee_update()` only prints message; no real fee tracking implemented.
- No input validation for student details.
- Implementation is basic and can be enhanced for full functionality.

### Task 3: Module-Level and Function-Level Documentation

#### Scenario

You are building a small calculator module that will be shared across multiple projects and requires structured documentation.

#### Requirements

- Write a Python script containing 3–4 functions (e.g., add, subtract, multiply, divide)
- Manually write NumPy Style docstrings for each function
- Use AI assistance to generate:
  - A module-level docstring
  - Individual function-level docstrings
- Compare AI-generated docstrings with manually written ones

- Evaluate documentation structure, accuracy, and readability

#### Expected Output

- Python script with manual NumPy-style docstrings
- AI-generated module-level and function-level documentation
- Comparison between AI-generated and manual documentation
- Clear understanding of structured documentation for multi-function scripts

#### PROMPT:

```
#write a python program to build a small calculator module that will be shared across multiple projects.

#it should have the following functions: add(), subtract(), multiply(), divide()

#Manually write NumPy Style docstrings for each function.

# Compare manual docstrings and AI-generated docstrings for clarity, correctness, and completeness.
#Explain differences.

# Run the docstring comparison analysis
```

#### CODE:

```
#write a python program to build a small calculator module that will be shared across multiple projects.

#it should have the following functions: add(), subtract(), multiply(), divide()

#Manually write NumPy Style docstrings for each function.
```

```
def add(a, b):
    """
    Compute the sum of two numbers.

```

#### Parameters

-----

a : float

The first number.

b : float

The second number.

#### Returns

-----

float

The sum of a and b.

"""

return a + b

def subtract(a, b):

"""

Compute the difference of two numbers.

Parameters

-----

a : float

The first number.

b : float

The second number.

Returns

-----

float

The difference of a and b.

"""

return a - b

def multiply(a, b):

"""

Compute the product of two numbers.

Parameters

-----

a : float

The first number.

b : float

The second number.

Returns

-----

float

The product of a and b.

"""

return a \* b

def divide(a, b):

"""

Compute the quotient of two numbers.

Parameters

-----

a : float

The dividend.

b : float

The divisor.

Returns

-----

float or str

The quotient of a and b, or an error message if division by zero occurs.

"""

if b == 0:

return "Error: Division by zero is not allowed."

return a / b

# Example usage

num1 = 10

num2 = 5

print(f"Addition: {add(num1, num2)}")

print(f"Subtraction: {subtract(num1, num2)}")

```
print(f"Multiplication: {multiply(num1, num2)}")  
print(f"Division: {divide(num1, num2)}")  
  
# Compare manual docstrings and AI-generated docstrings for clarity, correctness, and completeness. Explain  
differences.  
  
def docstring_comparison():  
    print("\n--- Docstring Comparison ---")  
  
    print("\nClarity:")  
    print("Manual docstrings are clear and concise.")  
    print("AI-generated docstrings provide more detailed explanations.")  
  
    print("\nCorrectness:")  
    print("Both sets of docstrings correctly describe the parameters, return values, and exceptions.")  
  
    print("\nCompleteness:")  
    print("AI-generated docstrings include additional information about the function's behavior and edge cases.")  
    print("Manual docstrings focus on the basic functionality without extra details.")  
  
    print("\nConclusion:")  
    print("AI-generated documentation is more comprehensive, while manual documentation is straightforward  
and to the point.")  
  
if __name__ == "__main__":  
    docstring_comparison() # Run the docstring comparison analysis
```

#### OUTPUT:

```
Addition: 15  
Subtraction: 5  
Multiplication: 50  
Division: None  
  
--- Docstring Comparison ---  
  
Clarity:  
Manual docstrings are clear and concise.  
AI-generated docstrings provide more detailed explanations.
```

**Correctness:**

Both sets of docstrings correctly describe the parameters, return values, and exceptions.

**Completeness:**

AI-generated docstrings include additional information about the function's behavior and edge cases.  
Manual docstrings focus on the basic functionality without extra details.

**Conclusion:**

AI-generated documentation is more comprehensive, while manual documentation is straightforward and clear.  
PS C:\Users\cheti>

**ANALYSIS:**

- All calculator functions (add, subtract, multiply, divide) are logically correct for basic arithmetic.
- NumPy-style docstrings are properly structured with Parameters and Returns sections.
- Code is modular and reusable across projects.
- divide() contains a logical error: return a / b is unreachable due to incorrect indentation.
- Returning a string for division by zero creates inconsistent return types (float or str).
- No input validation for non-numeric values.
- Docstring comparison section is theoretical, not an actual automated comparison.
- Overall implementation is good but needs minor fixes for correctness and robustness.